

# **Spot Safety Project Evaluation**

Project Log # 200611059

Spot Safety Project # 10-98-222

**Spot Safety Project Evaluation of the Right of Way Acquisition in the Northwest Corner of  
The Intersection of SR 1504 (Ridge Rd) and SR 1367 (Unionville-Indian Trail Rd)  
Union County**

Documents Prepared By:

Safety Evaluation Group  
Traffic Safety Systems Management Section  
Traffic Engineering and Safety Systems Branch  
North Carolina Department of Transportation

**Principal Investigator**

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Brad Robinson

Traffic Safety Project Engineer

August 29, 2007  
Date

## ***Spot Safety Project Evaluation Documentation***

### **Subject Location**

Evaluation of Spot Safety Project Number 10-98-222 – The Intersection of SR 1504 (Ridge Rd) and SR 1367 (Unionville-Indian Trail Rd) in Union County.

### **Project Information and Background from the Project File Folder**

SR 1504 (Ridge Rd) and SR 1367 (Unionville-Indian Trail Rd) are both two-lane facilities with speed limits of 55 mph and 45 mph, respectively. The treatment intersection is a four-leg intersection that is controlled by a stop condition on SR 1504 and an overhead flasher. Stallings Salvage company is located on the northwest corner of the intersection.

The original problem statement was that sight distance for motorists on the southbound approach of SR 1504 was periodically restricted along the eastbound approach of SR 1367 by building materials and delivery trucks along the shoulder. The purpose of the project was to acquire right-of-way along the frontage of Stallings Salvage company in order to cut a ditch along the frontage, thus eliminating parking and the placing of material on the shoulder.

The original crash analysis was conducted from January 1, 1994 through May 31, 1998 with a total of 14 crashes. The crashes included 11 Angle Crashes, 2 Left Turn-Same Roadway Crashes, and 1 Sideswipe Crash. The final completion date for the improvement at the subject intersection was on January 18, 2002 at a cost of \$20,000.

### **Naive Before and After Analysis**

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from November 1, 2001 through March 31, 2002. The before period consisted of reported crashes from December 1, 1996 through October 30, 2001 (4 years, 11 months) and the after period consisted of reported crashes from April 1, 2002 through February 28, 2007 (4 years, 11 months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact Crashes between vehicles on the north and west legs of the intersection were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<b><u>Treatment Information</u></b>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	9	10	11.1
Total Severity Index	3.47	3.96	14.1
Target Crashes	0	0	N/A
Volume	5600	5600	0.0
<b><u>Crash Severity Summary</u></b>			
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	1	0	-100.0
Class C	2	4	100.0
Property Damage Only	6	6	0.0

The naïve before and after analysis at the treatment location resulted in an 11 percent increase in Total Crashes, and no change in either Target Crashes or Average Daily Traffic (ADT). The before period ADT year was 1999 and the after period ADT year was 2004.

## Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 11 percent increase in Total Crashes and no change in ADT. There were no Target Crashes in either the before or the after periods.

Referencing the *Collision Diagrams*, 56 percent (5 of 9) of before period crashes and 60 percent (6 of 10) of after period crashes were frontal impact crashes involving a vehicle on the northern leg of SR 1504 and a vehicle on the eastern leg of SR 1367.

The calculated benefit to cost ratio for this project is –1.2 considering total crashes. The benefit to cost ratio considering only target crashes is 0.0. The benefits are calculated using the change in crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of road.

**BENEFIT-COST ANALYSIS WORKSHEET**

LOCATION: SR 1504 at SR 1367  
 COUNTY: Union  
 FILE NO.: SS 10-98-222

BY: Brad Robinson  
 DATE: 8/22/2007

DETAILED COST: TYPE IMPROVEMENT - Right of Way Acquisition

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$0	0	0.000	\$0
	\$0	0	0.000	\$0
Right-of-Way	\$20,000	10	0.149	\$2,981

TOTALS	\$20,000	10	0.149	\$2,981
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ESTIMATED INCREASE IN ANNUAL MAINT. COST =	\$0
ESTIMATED INCREASE IN ANNUAL UTILITY COST =	\$0
TOTAL ANNUAL COST=	\$2,981
TOTAL COST OF PROJECT=	\$20,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.92	0	0.00	3	0.61	6	1.22	\$15,732
AFTER	4.92	0	0.00	4	0.81	6	1.22	\$19,390

Annual Benefits from Crash Cost Savings (\$3,659)

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$6,639)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = -1.23

TOTAL COST OF PROJECT	-	\$20,000	COMPREHENSIVE B/C RATIO	-	-1.23
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**BENEFIT-COST ANALYSIS WORKSHEET TARGET**

LOCATION: SR 1504 at SR 1367  
 COUNTY: Union  
 FILE NO.: SS 10-98-222

BY: Brad Robinson  
 DATE: 8/22/2007

DETAILED COST: TYPE IMPROVEMENT - Right of Way Acquisition

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$0	0	0.000	\$0
	\$0	0	0.000	\$0
Right-of-Way	\$20,000	10	0.149	\$2,981

TOTALS	\$20,000	10	0.149	\$2,981
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ESTIMATED INCREASE IN ANNUAL MAINT. COST =	\$0
ESTIMATED INCREASE IN ANNUAL UTILITY COST =	\$0
TOTAL ANNUAL COST=	\$2,981
TOTAL COST OF PROJECT=	\$20,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.92	0	0.00	0	0.00	0	0.00	\$0
AFTER	4.92	0	0.00	0	0.00	0	0.00	\$0

Annual Benefits from Crash Cost Savings	\$0
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NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST	=	(\$2,981)
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST	=	0.00

TOTAL COST OF PROJECT	-	\$20,000	COMPREHENSIVE B/C RATIO	-	0.00
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Treatment Location: SR 1367 (Unionville-Indian Trail) and SR 1504 (Ridge)

Treatment Site Photos Taken July 11, 2007



Looking North from SR 1504 (Ridge Rd)



Traveling South on SR 1504 (Ridge)



Traveling Southwest on SR 1367 (Unionville-Indian Trail Rd)



Traveling Southwest on SR 1367 (Unionville-Indian Trail Rd)



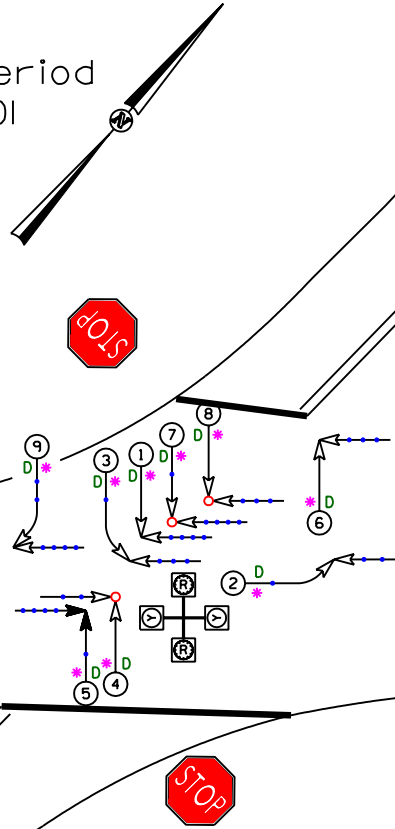


Looking at Treatment Corner

Union County  
 SR 1504 (Ridge Rd) and  
 SR 1367 (Unionville-Indian Trail Rd)  
 Treatment Site in the Before Period  
 December 1, 1996 - October 30, 2001

SR 1367  
 (Unionville-Indian Trail)  
 45 mph

SR 1504  
 (Ridge Rd)  
 55 mph



# LEGEND

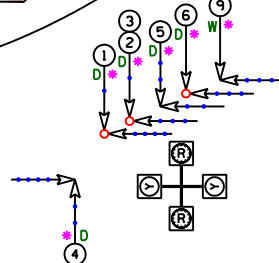
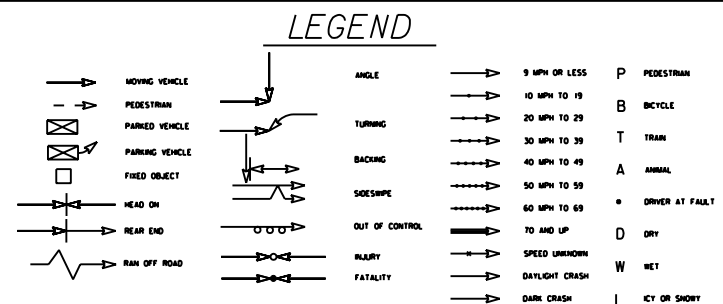
→ MOVING VEHICLE	→ ANGLE	→ 9 MPH OR LESS	P PEDESTRIAN
- - - PEDESTRIAN	→ TURNING	→ 10 MPH TO 19	B BICYCLE
☒ PARKED VEHICLE	→ BACKING	→ 20 MPH TO 29	T TRAIN
☒ PARKING VEHICLE	→ SHOULDER	→ 30 MPH TO 39	A ANIMAL
□ FIXED OBJECT	→ OUT OF CONTROL	→ 40 MPH TO 49	* DRIVER AT FAULT
→ HEAD ON	→ INJURY	→ 50 MPH TO 59	D DRY
→ REAR END	→ FATALITY	→ 60 MPH TO 69	W WET
→ RAN OFF ROAD		→ 70 AND UP	I ICE OR SNOW


TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		DIVISION: ..	AREA: ..
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		STUDY PERIOD: 12/1/96 TO 10/30/2001	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		DISTANCE: ..... Y-LINE: 150 FT	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		ANALYSIS PREPARED BY: B. BORDEN	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		DIAGRAM PREPARED BY: B. BORDEN	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		DIAGRAM REVIEWED BY: .....	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		SCALE: NOT TO SCALE	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		DATE: July, 2007	
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		LOG NUMBER: .....	
N.C. DEPARTMENT of TRANSPORTATION			
DIVISION of HIGHWAYS			
TRAFFIC ENGINEERING AND SAFETY			
SYSTEMS BRANCH			

Union County  
 SR 1504 (Ridge Rd) and  
 SR 1367 (Unionville-Indian Trail Rd)  
 Treatment Site in the After Period  
 April, 2002 - February 28, 2007

SR 1367  
 (Unionville-Indian Trail)  
 45 mph

SR 1504  
 (Ridge Rd)  
 55 mph



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
IMPROVEMENT PROGRAM		SAFETY INFORMATION	
		DIVISION: ..	AREA: ..
		STUDY PERIOD: 4/1/2002 TO 2/28/2007	
		DISTANCE: ..... T-MILE: 150 FT	
		ANALYSIS PREPARED BY: B. BORDEN	
		DIAGRAM PREPARED BY: B. BORDEN	
SAFETY EVALUATION		TRAFFIC SAFETY	
AFTER		SCALE: NOT TO SCALE	
		DATE: July, 2007	
		LOG NUMBER: .....	
<b>N.C. DEPARTMENT of TRANSPORTATION</b> <b>DIVISION of HIGHWAYS</b> <b>TRAFFIC ENGINEERING AND SAFETY</b> <b>SYSTEMS BRANCH</b>			